No. 8200034

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Northrup King Co.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

ALFALFA

'Spredor 2'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington this 30th day of April in the year of our Lord one thousand nine hundred and eighty-four.

Attest:

Kenneth H. Evans
Commissioner
Plant Variety Protection Office
Grain Division
Agricultural Marketing Service

John R Block
Secretary of Agriculture

INSTRUCTIONS

GENERAL: Send an original copy of the application and exhibits, at least 2,500 viable seeds, and $500 fee ($250 filing fee and $250 examination fee) to U.S. Dept. of Agriculture, Agricultural Marketing Service, Livestock, Poultry, Grain and Seed Division, Plant Variety Protection Office, National Agricultural Library Building, Beltsville, Maryland 20705. (See section 180.175 of the Regulations and Rules of Practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

ITEM

5 Give the date the applicant determined that he had a new variety based on (1) the definition in section 41(a) of the Act and (2) the date a decision was made to increase the seed.

13a Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4) evidence of uniformity and stability.

13b Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties: (1) identify these varieties and state all differences objectively; (2) attach statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty.

13c Fill in the Exhibit C, Objective Description form, for all characteristics for which you have adequate data.

13d Describe any additional characteristics that are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe, such as, plant habit, plant color, disease resistance, etc.

14a If "YES" is specified (seed of this variety be sold by variety name only as a class of certified seed) the applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled, his decision published, or the certificate has been issued. However, if the applicant specified "NO," he may change his choice. (See section 180.16 of the Regulations and Rules of Practice.)

15a See section 42 of the Plant Variety Protection Act and section 180.7 of the Regulations and Rules of Practice.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

FORM APPROVED
OMB NO. 40-R3822

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1a. TEMPORARY DESIGNATION OF VARIETY	1b. VARIETY NAME	FOR OFFICIAL USE ONLY
K6-11	Spredor 2	PV NUMBER 8200034

2. KIND NAME	3. GENUS AND SPECIES NAME	FILING DATE	TIME
Alfalfa	Medicago media Pers.	12/11/81	12:00 A.M. (P.M.)

4. FAMILY NAME (BOTANICAL)	5. DATE OF DETERMINATION	FEE RECEIVED	DATE
Leguminosae	October 1978	$ 500.00 $ 250.00	12/11/81 4/4/84

6. NAME OF APPLICANT(S)	7. ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*	8. TELEPHONE AREA CODE AND NUMBER
Northrup King Co.	1500 Jackson St. N.E. Minneapolis, MN 55413	612-781-5305

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)*	10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION	11. DATE OF INCORPORATION
Corporation	Delaware	1896

12. NAME AND MAILING ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS:

Robert W. Romig
Northrup King Co.
1500 Jackson St. N.E., Minneapolis, MN 55413

13. **CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:**

- [X] 13A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
- [X] 13B. Exhibit B, Novelty Statement.
- [X] 13C. Exhibit C, Objective Description of the Variety *(Request form from Plant Variety Protection Office.)*
- [X] 13D. Exhibit D, Additional Description of the Variety.

14a. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a). (If "Yes," answer 14B and 14C below.)* [ ] YES [X] NO

14b. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?	14c. IF "YES," TO 14B, HOW MANY GENERATIONS OF PRODUCTION BEYOND BREEDER SEED?
[ ] YES [ ] NO	[ ] FOUNDATION [ ] REGISTERED [ ] CERTIFIED

15a. DID THE APPLICANT(S) FILE FOR PROTECTION OF THIS VARIETY IN OTHER COUNTRIES? [ ] YES [X] NO *(If "Yes," give name of countries and dates.)*

15b. HAVE RIGHTS BEEN GRANTED THIS VARIETY IN OTHER COUNTRIES? [ ] YES [X] NO *(If "Yes," give name of countries and dates.)*

16. DOES THE APPLICANT(S) AGREE TO THE PUBLICATION OF HIS/HER (THEIR) NAME(S) AND ADDRESS IN THE OFFICIAL JOURNAL? [X] YES [ ] NO

17. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

DECEMBER 7, 1981
(DATE)

Robert W. Romig
(SIGNATURE OF APPLICANT)

(DATE)

(SIGNATURE OF APPLICANT)

FORM GR-470 (1-78)

EXHIBIT A
Origin and Breeding History of the Variety

Spredor 2 alfalfa is a synthetic variety derived from a random intercrossing among 43 selected parent plants. These parent plants are themselves selections from the following: 1 each from the varieties Spredor, Rambler, and Travois; 2 each from the varieties Roamer and Kane; and 36 plants selected from 8 different experimental creeping rooted populations. These 8 experimental populations were derived, 1 each, from the varieties Travois, Rambler, Vernal, Drylander, Kane, Roamer, Glacier, and Cardinal. Development of these 8 experimental populations began in 1959 at our Eden Prairie, Minnesota, research farm. In 1966, we moved this material to our research operation at Washington, Iowa, where we made the final selections.

All the plants contributing to Spredor 2 were originally selected from either space-planted nurseries or bacterial wilt nurseries in the field. The primary selection criterion was for the creeping rooted habit. Other criteria were resistance to bacterial wilt, persistence with close and frequent mowing, fast rate of recovery or regrowth, and seed set. A final selection for seed set was conducted in the greenhouse based on the results of hand pollinations.

We bulked the hand-pollinated seed produced on the best 43 seed-producing plants in the greenhouse. This seed was planted at Othello, Washington, to produce breeders seed, i.e., Syn 2, of Spredor 2, which we used for subsequent performance evaluation.

Flower color is variable. About 34% are light purple, 12% medium dark purple, 15% dark purple, 5% yellow, and 34% variegated. Spredor 2 is stable for creeping root habit and for fall dormancy.

EXHIBIT A, continued

addendum

No variants exist beyond limits defined under Exhibit C. Spredor 2 is stable for all essential and distinguishing characters during normal seed multiplication. Spredor 2 is as uniform as other alfalfa varieties presently accepted by state seed certifying programs. Spredor 2 was approved as eligible for certification by the National Alfalfa Variety Review Board in 1980.

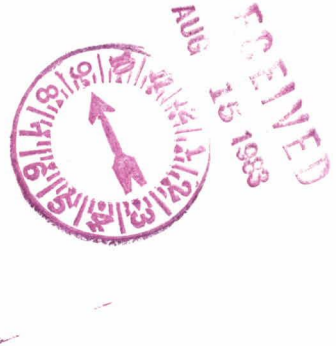
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EXHIBIT B
Novelty Statement

Spredor 2 is most similar to Spredor, but differs in having a higher frequency of creeping plants. Spredor 2 has 54% spreading plants compared with 26% for Spredor at 1 year of age at Washington, Iowa.

EXHIBIT B, continued

Comparison of the creeping rooted characteristic of Spredor 2 with Spredor, one year following stand establishment at Washington, Iowa.

Test[1]	Percent Creeping of Spredor 2	Percent Creeping of Spredor	Difference
1978-79	53.8	25.3	28.5
1982-83	47.9	19.0	28.9
Average	50.8	22.15	28.7
Variance			0.010
Standard Deviation			0.200
t Value			143.5*

1) Nurseries established in spring of 1978 and 1982 with observations taken on June 20, 1979 and June 17, 1983, respectively, with a plant spacing of 3 feet.

The difference in creeping between Spredor 2 and Spredor is significant in both years (28.9 ± 1.8). It is also clear that the creeping characteristic of Spredor 2 at Washington, Iowa is repeatable based on a chi-square test for independence or no interaction.

Test		Creeping	Non Creeping	Total
1978-79	Observed	248	213	461
	Expected	241.6	219.4	
1982-83	Observed	68	74	142
	Expected	74.4	67.6	
Total		316	287	603

Chi-Square = .17 + .19 + .60 + .61 = 1.57 N.S.

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

INSECT	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				
NEMATODE	**CULTIVAR**	**% RESISTANT PLANTS**			**TEST, YEAR & LOCATION 4/**
STEM NEMATODE	(SUBMITTED)	26.8			Northrup King Co. Eden Prairie, MN 1980
	(RES. CK.) LAHONTAN	42.0	40 - too high		
	(SUS. CK.) RANGER	21.4			
NORTHERN ROOT KNOT NEMATODE	(SUBMITTED)				
	(RES. CK.) NEV. SYN. XX				
	(SUS. CK.) LAHONTAN				
SOUTHERN ROOT KNOT NEMATODE	(SUBMITTED)				
	(RES. CK.) MOAPA 69				
	(SUS. CK.) LAHONTAN				
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				

13. INDICATE A VARIETY THAT MOST CLOSELY RESEMBLES THE VARIETY SUBMITTED FOR THE FOLLOWING CHARACTERS:

CHARACTER	VARIETY	CHARACTER	VARIETY
AREA OF ADAPTATION	Vernal	PLANT HEIGHT	Travois
RECOVERY AFTER CUTTING	Roamer	WINTER HARDINESS	Roamer

REFERENCES

Barnes, D.K., and C.H. Hanson, An Illustrated Summary of Genetic Traits in Tetraploid and Diploid Alfalfa, ARS Technical Bul. 1370.
Barnes, D.K., et al, Standard Tests to Characterize Pest Resistance in Alfalfa Varieties. ARS-NC-19, September 1974.
Nittler, L.W., G.W. McKee, and J.L. Newcomer, Principles and Methods of Testing Alfalfa Seed for Varietal Purity. New York Agricultural Experiment Station Bul. 807.
USDA Agricultural Handbook No. 424.

COMMENTS

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

DISEASE	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				

INSECT	CULTIVAR	% SEEDLING SURVIVAL	AVG' SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
PEA APHID	(SUBMITTED)		2.58	.30	Northrup King Co. Eden Prairie, MN 1980
	(RES. CK.) KANZA		2.35		
	(SUS. CK.) RANGER		3.73		
SPOTTED ALFALFA APHID	(SUBMITTED)				
	(RES. CK.) KANZA				
	(SUS. CK.) RANGER				

INSECT	CULTIVAR	% DEFOLIATION	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
ALFALFA WEEVIL	(SUBMITTED)				
	(RES. CK.) ARK				
	(SUS. CK.) VERNAL				

INSECT	CULTIVAR	% RESISTANT PLANTS	EMERGED ADULTS PER PLANT	EMERGED LSD .05	TEST, YEAR & LOCATION 4/
ALFALFA SEED CHALCID	(SUBMITTED)				
	(RES. CK.) LAHONTAN				
	(SUS. CK.) SONORA				

INSECT	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY	ASI	TEST, YEAR & LOCATION 4/
per appl letter 8/4/83 POTATO LEAF-HOPPER	~~CHEROKEE~~ (SUBMITTED) SPREDOR 2	6.8			Northrup King Co. Eden Prairie, MN 1980
	~~RANGER~~ (RES. CK.) CHEROKEE	46.8			
	(SUS. CK.) RANGER	11.8			
BLUE ALFALFA ~~XXXX~~ APHID	(SUBMITTED)	15.0			Northrup King Co. Eden Prairie, MN 1979
	(RES. CK.) CUF 101	71.0			
	(SUS. CK.) RANGER	24.3			

Not good ✓
↑ too high
← NOT STD ✓

4/ Give: The institution in charge of test, (2) year, and (3) location of test. Describe test procedure if it differs from procedure suggested in ARS-NC-19, September 1974.

8200034

NORTHRUP KING CO.
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ROBERT W. ROMIG, PhD — VICE PRESIDENT, RESEARCH

PHONE 612-781-5305

Dr. Kenneth H. Evans
Plant Variety Protection Office
National Agricultural Library
Beltsville, Maryland 20705

August 4, 1983

Subject: Application No. 8200034, Alfalfa, Spredor 2 Addendum to Exhibit C

Dear Dr. Evans:

Enclosed are continuations of Exhibits A and B, as were requested. For Exhibit C Item 5, "Days Earlier Than" the variety is Drylander which flowers two days after Spredor 2. For Item 12, "Fusarium Wilt," the resistant check variety was Agate and the susceptible check variety was Mn GN-1. For "Potato Leafhopper," the data for Cherokee and Ranger are incorrectly identified. This should read as follows:

Cultivar	% Resistant Plant	ASI
Spredor 2	6.8	4.82
Cherokee (Res. Ck)	46.8	3.42
Ranger (Sus. Ck)	11.8	5.18

For distinctness from varieties of prior public knowledge, I have sent in an addendum for Exhibit D.

I hope this will take care of the questions concerning this application. Thank you for your patience and thoughtfulness in this matter.

Sincerely,

Robert W. Romig

Robert W. Romig

sas

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10. GIVE ITEM LENGTH FREQUENCY DISTRIBUTION FOR SUBMITTED AND 1 TO 5 STANDARD VARIETIES 1/

VARIETY NAME	STEM LENGTH FREQUENCY DISTRIBUTION 2/											AVERAGE STEM LENGTH
	0 – 5 mm. %	6 – 10 mm. %	11 – 15 mm. %	16 – 20 mm. %	21 – 30 mm. %	31 – 40 mm. %	41 – 50 mm. %	51 – 60 mm. %	61 – 70 mm. %	71 – 80 mm. %	81 + mm. %	

11. FLOWER COLOR 3/ (DETERMINE COLOR ON FRESHLY OPENED FLOWERS)

0 4 0 % PURPLE | 0 5 2 % VARIEGATED | 0 0 7 % YELLOW | 0 0 1 % CREAM | 0 0 0 % WHITE

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

DISEASE	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
BACTERIAL WILT	(SUBMITTED)	53.9	58		University of Minnesota St. Paul, MN 1979
	(RES. CK.) VERNAL	39.2	42		
	(SUS. CK.) NARRAGANSETT	0.0	60		
ANTHRACNOSE	(SUBMITTED)	2.0	62		Northrup King Co. Woodland, CA 1980
	(RES. CK.) ARC	73.0	65		
	(SUS. CK.) SARANAC	0.0	00		
COMMON LEAF SPOT	(SUBMITTED)				
	(RES. CK.) RAMSEY				
	(SUS. CK.) RANGER				
DOWNY MILDEW	(SUBMITTED)				
	(RES. CK.) SARANAC				
	(SUS. CK.) KANZA				
PHYTOPHTHORA ROOT ROT	(SUBMITTED)				
	(RES. CK.) AGATE				
	(SUS. CK.) SARANAC				
Fusarium Wilt	(SUBMITTED)	32.4			University of Minnesota St. Paul, MN 1980
OTHER	(RES. CK.) 'AGATE'	71.5			
even for letter 8/4/83	(SUS. CK.) 'MN GN-1'	6.9			

Foohigh

1/ Preferred standards: Saranac, Vernal, Norseman, Lahontan, Mesa Sirsa. Twelve hours light at 25° C with 20,000 lux of cool white florescent; 2,000 lux of incandescent filament light and twelve hours darkness at 5° C.

2/ From cotyledonary node to tip of stem 20 days after planting.

3/ For further clarification consult USDA Agricultural Handbook No. 424.

4/ Give: The institution in charge of test, (2) year, and (3) location of test. Describe test procedure if it differs from procedure suggested in ARS-NC-19, September 1974.

FORM APPROVED. OMB NO. 40-R3712

FORM GR 470-32
(3/75)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C

OBJECTIVE DESCRIPTION OF VARIETY

Alfalfa (Medicago sativa L. complex)

NAME OF APPLICANT(S)
Northrup King Co.

ADDRESS (*Street and No., or R.F.D. No., City, State, and Zip Code*)
P. O. Box 959
Minneapolis, MN 55440

VARIETY NAME OR TEMPORARY DESIGNATION
Spredor 2

FOR OFFICIAL USE ONLY
PVPO NUMBER
8200034

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

NOTE: For single plant data a minimum of 100 plants is suggested

1. PRIMARY AREA OF ADAPTATION

[2]
1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST
4 = SOUTHEAST 5 = SOUTHWEST 6 = SOUTHERN PLAINS
7 = INTERMOUNTAIN

INDICATE AREA WHERE TEST WAS CONDUCTED. FURTHER EXPLANATION CAN GO IN COMMENTS AT THE END OF THE FORM.
[2] AREA TESTED

2. WINTER HARDINESS

[9]
1 = NON-HARDY (Mesa Sirsa) 3 = INTERMEDIATE NON-HARDY
5 = MODERATELY HARDY (Saranac) 7 = HARDY (Vernal)
9 = EXTREMELY HARDY (Norseman)

[2] SOURCE OF INFORMATION: 1 = ANTICIPATED 2 = MEASURED

[2] AREA TESTED

3. FALL GROWTH HABIT

[9]
1 = ERECT (Mesa Sirsa) 3 = SEMIERECT (DuPuits)
5 = INTERMEDIATE (Saranac) 7 = SEMIDECUMENT (Vernal)
9 = DECUMBENT (Norsement)

[2] AREA TESTED

4. RECOVERY AFTER FIRST SPRING CUTTING

[9]
1 = VERY FAST (Mesa Sirsa) 3 = FAST (Saranac) 5 = INTERMEDIATE
7 = SLOW (Vernal) 9 = VERY SLOW (Norseman)

[2] AREA TESTED

5. FLOWERING DATE (FIRST SPRING GROWTH)

[0][2] DAYS EARLIER THAN . . . . .
[0][1] DAYS LATER THAN . . . . .

[6] [4]
1 = MESA SIRSA 2 = LAHONTAN
3 = SARANAC 4 = VERNAL
5 = NORSEMAN 6 = Drylander per appl letter 8/4/83 ENB

[2] AREA TESTED

6. CROWN TYPE

[1]
1 = SPREADING ROOTS 3 = SPREADING RHIZOMES (Teton)
5 = BROAD (Vernal) 7 = INTERMEDIATE (Saranac)
9 = NARROW (Mesa Sirsa)

[2] AREA TESTED

7. PLANT COLOR

[4]
3 = DARK GREEN (Weevlchek) 5 = GREEN (Vernal)
7 = LIGHT GREEN (Ranger)

[2] AREA TESTED

8. HAIRINESS

[0][0][4] % PLANTS WITH PUBESCENT STEMS

[0][6][5] % PLANTS WITH PUBESCENT PODS

9. POD SHAPE

[0][0][7] % PLANTS WITH TIGHT COILS

[0][7][9] % PLANTS WITH LOOSE COILS

[0][1][4] % PLANTS WITH SICKLE PODS (Less than 1 coil)

8200034

EXHIBIT D
Additional Description of the Variety

Spredor 2 is a variety with a high percentage of creeping rooted plant (Table 1). The fall growth habit is similar to that of Roamer and intermediate between that of Vernal and Travois (Table 2). Spredor 2 is slightly more fall dormant than Vernal (Table 3).

Spredor 2 is resistant to bacterial wilt, moderately resistant to Fusarium wilt and to pea aphid, and susceptible to both anthracnose and stem nematode. Forage yield is slightly less than that of Vernal.

EXHIBIT D, continued

Spredor 2 satisfies the distinctness from the varieties of prior public knowledge on the basis of the spreading characteristic noted at Washington, Iowa for Kane, Roamer and Spredor and on a difference in fall dormancy for Prowler as shown below.

A. Percentage of Creeping-Rooted Plants
One Year Following Establishment
Washington, Iowa

Variety	1978-79	1982-83	Average
	%	%	%
Spredor 2	53.8	47.9	50.8
Spredor	25.9	19.0	22.4
Kane	14.5	9.9	12.2
Roamer	5.4	9.0	7.7
Average	24.9	21.4	23.2

L.S.D. .05 = 5.0%

Analysis of variance shows that the differences for years is not significant whereas the differences for varieties is significant.

B. Fall Dormancy Rating[1)]

Variety	1980 Stanton, MN[2)]	1981 Washington, IA[3)]
Spredor 2	7.13 Δ.37	6.72 Δ.4
Prowler	7.50	7.12
L.S.	.12	.28
CV	11%	18%

1) Dormancy scored 0-9, 0 = 18 inches or taller, 9 = 0-2 inches.

2) Established in spaced rows spring 1980, cut September 15, and rated October 15, 1980.

3) Established in spaced rows spring 1981, cut September 10, and rated October 22, 1981.


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TABLE 1. CROWN AND CREEPING-ROOT DEVELOPMENT*
WASHINGTON, IOWA

CULTIVAR	No. of Plants Observed	Percent of Plants Creeping-rooted 10/24/78	5/4/79	6/20/79	Av. Width (cm) of Creeping Plants 6/18/79	Av. Crown Width (dm) Non-Creeping Plants 6/18/79
Spredor 2	461	14.3	31.5	53.8	72.8	25.3
Travois	81	0	2.5	9.0	57.3	29.7
Rambler	76	1.3	1.3	4.2	56.7	25.9
Victoria	83	0	0	0	----	25.9
NC-CR-1	214	0.9	5.6	14.8	56.7	23.8
Drylander	70	1.4	1.4	14.3	54.3	21.8
Kane	87	0	4.6	14.5	49.5	26.4
Roamer	75	0	1.3	5.4	55.0	23.8
Vernal	86	0	0	0	----	24.5
Spredor	83	3.6	13.3	25.9	62.3	26.7

*Nursery established spring of 1978, plants spaced 3 feet apart between and within rows.

TABLE 2. FALL GROWTH HABIT*
WASHINGTON, IOWA

CULTIVAR	No. of Plants Observed	Percent of Plants Growth Class**					Average Rating
		1	2	3	4	5	
Spredor 2	452	42.0	47.8	9.5	0.7		1.69
Travois	80	80.0	18.8	1.2			1.21
Vernal	85	13.0	32.9	32.9	14.1	7.1	2.69
Rambler	72	55.6	36.1	8.3			1.53
Victoria	82	39.0	40.2	15.9	3.7	1.2	1.88
NC-CR-1	213	6.6	22.5	30.1	23.0	17.8	3.23
Drylander	70	61.4	34.3	4.3			1.43
Kane	85	42.4	40.0	14.1	3.5		1.79
Roamer	74	44.6	44.6	6.8	4.0		1.70
Spredor	82	68.3	25.6	6.1			1.38

*Seedlings transplanted from greenhouse to field May 24, 1978, plants spaced 3 feet apart between and within rows. Plants were clipped September 11, 1978, and fall growth habit ratings made October 24, 1978.

**Plants rated 1-5, 1 = prostrate, 5 = upright.

TABLE 3. FALL DORMANCY*

WASHINGTON, IOWA - 1980

CULTIVAR	Percent of Plants Growth Class**										Average Growth Index
	0	1	2	3	4	5	6	7	8	9	
Spredor 2						1.1	2.4	15.5	64.3	16.7	7.93
Vernal						2.6	21.8	41.0	30.8	3.8	7.12
Sarnac AR				2.5	7.5	5.0	36.3	30.0	18.7		6.40

*Seedlings transplanted from greenhouse to field May 5, 1980, spaced 18" apart in 36" rows, 6 replications, 15 plants/rep. Plants were clipped July 9, August 13, and September 12. Fall dormancy readings made October 15.

**Fall dormancy scored 0-9, 0 = 18" or higher, 9 = 0" - 2".

State of Delaware

Office of the Secretary of State

I, EDWARD J. FREEL, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF AMENDMENT OF "NORTHRUP KING CO.", CHANGING ITS NAME FROM "NORTHRUP KING CO." TO "NOVARTIS SEEDS, INC.", FILED IN THIS OFFICE ON THE THIRTIETH DAY OF DECEMBER, A.D. 1996, AT 9 O'CLOCK A.M.

A CERTIFIED COPY OF THIS CERTIFICATE HAS BEEN FORWARDED TO THE NEW CASTLE COUNTY RECORDER OF DEEDS FOR RECORDING.

GREAT SEAL OF THE STATE OF DELAWARE · 1793 · 1847 · 1907 ·

LIBERTY AND INDEPENDENCE

Edward J. Freel, Secretary of State

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960389892

AUTHENTICATION: 8267947

DATE: 12-31-96

CERTIFICATE OF AMENDMENT OF CERTIFICATE OF INCORPORATION

OF

NORTHRUP KING CO.

It is certified that:

1. The name of the corporation (hereinafter called the "Corporation") is Northrup King Co.

2. The Certificate of Incorporation of the Corporation is hereby amended by striking out Section 1 thereof and by substituting in lieu of said Section the following new Section.

1. The name of the Corporation is Novartis Seeds, Inc.

3. The amendment of the certificate of incorporation herein certified has been duly adopted and written consent has been given in accordance with the provisions of Sections 228 and 242 of the General Corporation Law of the State of Delaware.

4. The effective date of the amendment herein certified shall be January 1,1997.

Signed on December 27, 1996.

Edward C. Resler
Vice President & Secretary